ORIENTATION DETECTION MARKER, ORIENTATION DETECTION DEVICE AND VIDEO GAME DECIVE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an orientation detection device and orientation detection marker for detecting the orientation of a controller for performing input operations by orienting the screen of the display unit for displaying images.

[0003] 2. Description of the Related Art

[0004] Conventionally known is a video game machine wherein a game image (picture) is displayed on the screen in front of the player, and the player experiences virtual reality by using a simulated gun controller and shooting at the displayed target object (game character).

[0005] As an example of such foregoing video game machine, there is the shooting video game machine described in Japanese Patent Publication No. 2961097, which images the two infrared emitting LEDs disposed at prescribed positions on the screen with the CCD camera provided near the muzzle of the simulated gun, and detects the center of the imaged range; that is, muzzle direction with respect to the center of the imaged range, from the positional relationship of the image of the two infrared emitting LEDs in within the CCD image.

[0006] Also known is a type comprising a CCD camera on the game device side and which makes the player wear a plurality of detection subjects. By imaging the movement of the respective detection subjects with the CCD camera, the movement of the player; for instance, the extension of the arm, is detected and reflected in the game progress in the likes of a hand-to-hand combat game.

SUMMARY OF THE INVENTION

[0007] Nevertheless, with the shooting video game machine employing the two infrared emitting LEDs for detection in the former, since the play area has a prescribed wideness on the horizontal surface, there is a limit in accurately detecting the muzzle direction when the simulated gun as the controller is able to move, or when the simulated gun may be rotationally operated. Further, with the later game device, there is a limit in versatility in terms of having to impose a complicated action of wearing a plurality of detection subjects, and, since the detection of the movement of the detection subjects can only be made to a degree of understanding the change in position, there is a limit in applying this to a more sophisticated game with such amount of information.

[0008] The present invention was devised in view of the foregoing problems, and the object thereof is to provide an orientation marker capable of remotely measuring the movement, particularly the orientation, of a controller having a simple structure, which may be employed in a more sophisticated game, and which is highly versatile; an orientation detection device for remotely measuring the orientation (posture) of the controller with such orientation detection marker; and a video game device employing the above.

[0009] In order to achieve the foregoing object, the orientation detection marker according to the present invention is provided in either one of the device main body and a controller for performing input operations as being pointed to a screen of a display unit provided to the device main body for displaying images, for detecting the orientation of the controller with respect to the screen, and which supplies information for computing said orientation to a picture image generated by imaging means provided in the other of the device main body and the controller, wherein said orientation detection marker comprises a light source having a mode including biaxial direction information.

[0010] According to the foregoing structure, a picture image is generated with the imaging means provided to the device main body side and one of the controllers. An image of the orientation detection markers is contained in the picture image. Since the orientation detection marker includes biaxial direction information, in addition to the position information of the controller, and (rotation) inclination centered around the axis of orientation of the controller; that is, rotation angle information is also included in the picture image. Thus, the orientation of the controller with respect to the screen may be computed from this position information and rotation angle information.

[0011] These and other objects, features, and advantages of the present invention will become more apparent upon reading the following detailed description along with the accompanying drawings

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] **FIGS. 1A and 1B** are diagrams showing the shifting of the projected image on the screen of the shooting video game machine pertaining to the first and second embodiments of the present invention;

[0013] **FIG. 2** is a diagram showing the first example of the foregoing projected image;

[0014] **FIG. 3** is a diagram showing another example of the foregoing projected image;

[0015] **FIG. 4** is a diagram showing the second example of the foregoing projected image;

[0016] **FIG. 5** is a diagram showing the change in the displayed image accompanying the player's movement to the left and right;

[0017] **FIG. 6** is a diagram showing the appearance of the foregoing video game machine;

[0018] **FIG. 7** is a typical cross section for explaining the shifting of the projected image on the screen;

[0019] **FIGS. 8A, 8B** and **8**C are diagrams showing the structure of the gun unit, and **FIG. 8A** is a partial cross section of the side view; **FIG. 8B** is the front view of the marker substrate; and **FIG. 8C** is a diagram showing an example of the marker image;

[0020] **FIG. 9** is a cross section showing an example of the marker mounting structure;

[0021] **FIG. 10** is a typical cross section showing the acrylic plate disposed for protecting the rotation of the mirror and projection of the image from the projector;